

of *-cheila* (Greek: lip) is inconsistent being rendered severally as *-cheila*, *-chila*, or *-chile* (e.g., *Amblycheila*, *Neochila*, and *Platychile* respectively).

2. Despite Article 36a of the International Code of Zoological Nomenclature, 3rd edition, 1985, Wiesner credits authorship of nomotypic ranks between subfamily and subtribe to others than Latreille for Cicindelidae Latreille 1806 (e.g., Cicindelinae Csiki 1906, Cicindelini Sloane 1906, and Cicindelina W. Horn 1908). Latreille is the author of all four names.

3. Theses and dissertations, although not constituting formal publication, do contain valuable information. Several from the United States and Canada and widely quoted in the literature were not cited by Wiesner. I do not personally accept the philosophy of some that an author is not obligated to refer to a given available source.

4. Wiesner uses species-groups inconsistently. Among others, *Ctenostoma*, *Tricondyla*, *Collyris*, *Megacephala*, and *Therates* are so divided but *Cicindela*, quite established in the literature (e.g., Rivalier's subdivisions of his subgenus *Cicindela*), is not.

5. In listings of subspecies under a given species, Wiesner does not give the nominate subspecies its own lower case letter. Personally, I would number the nominate subspecies "a" and each succeeding subspecies "b," etc.

6. The English version of the Introduction is replete with grammatical errors, some phrases so incomprehensible to me that I needed to read the German version. Wiesner must have this section carefully proof-read for future editions.

Despite the daunting price, Wiesner's contribution is invaluable to every student of tiger beetle systematics. I have happily converted his systematic index into a checklist for curatorial purposes. The wealth of literature listings greatly reduces my time for gathering sources. Anyone studying any sort of comparative biology of any series of species can determine instantly how those species may be interrelated. My heartfelt thanks go to Dr. Wiesner for his work and my hope as well that the next edition will have the minor flaws eliminated.—*Sanford Leffler, 4701 15th Av. NE, #6, Seattle, Washington 98105.*

*J. New York Entomol. Soc.* 102(3):397–399, 1994

**Biology and Conservation of the Monarch Butterfly.**—Stephen B. Malcolm and Myron P. Zalucki, editors. 1993. Natural History Museum of Los Angeles Science Series no. 38. Los Angeles, California. 419 pp. Price: \$90.00 (cloth).

The natural history of the monarch butterfly (Nymphalidae, Danainae, *Danaus plexippus*, L.) has without doubt been more thoroughly studied than that of any other insect, if not any living thing. The monarch has been a model organism in studies of mimicry, ecological chemistry, migration and overwintering biology and its subfamily is one of the few butterfly groups with a robust phylogenetic hypothesis of relationships (Ackery and Vane-Wright, 1984). It is also probable that the monarch is the only economically unimportant insect to have had two international symposia devoted to its biology and conservation. This book is the proceedings of the Second International Conference on the Monarch Butterfly, or "Moncon 2," held at the Los Angeles County Museum on 2–5 September 1986.

The book succeeds admirably in most aspects as a conference proceedings volume. Although it is a collection of original papers on primary research by 50 authors, there is considerable continuity of style and quality among the individual contributions. The production quality of the text, tables and figures is as high as one would expect to see in a first-rank journal. The editors have divided the papers into sensible subdisciplinary categories, and written useful introductory and concluding remarks that explain the book's structure and highlight the various authors' salient points. Each section is headed by a full-page plate (two are in color) illustrating diverse aspects of monarch biology. The sections are as follows:

**Systematics:** one paper on the evolutionary origins of the monarch from a phylogenetic perspective.

**Chemical Communication:** three papers addressing pheromones and the controversial role of pyrrolizidine alkaloids in courtship and defense.

**Mating Behavior:** three papers, including Van Hook, which demonstrate surprising reverse-assortative mating in Mexican overwintering colonies.

**Host Plant Use, Cardenolide Sequestration, and Defense against Natural Enemies:** six papers, ranging from phylogenetic analysis of host plant use to quantitative models of cardenolide storage by monarch caterpillars.

**Physiological Ecology and the Annual Cycle:** four papers examining hormonal control of reproductive diapause and thermal biology during overwintering in monarchs and other danaid species.

**Migration:** eight papers, including several which challenge the conventional wisdom about the migration phenomenon.

**Overwintering Biology:** eight papers covering the distribution and ecology of Californian and Mexican overwintering sites, and various aspects of predation ecology in the Mexican colonies.

**Conservation:** one long paper and seven brief reports on aspects of the monarch conservation efforts in Mexico and California.

Unfortunately, there is no cumulative bibliography at the end. This makes the reproduction of individual articles easier, but hampers a quick but comprehensive survey of the breadth of the literature. Printing individual citations also must have added substantially to the length of the book: some references are cited repeatedly (e.g., Urquhart, 1960, 15 times; Tuskes and Brower, 1978, 11 times; Brower, 1984, 12 times).

Several contributions in the book deserve individual praise. Van Hook's revelation that small, tattered males preferentially mate with large females in good condition at the annual breakup of Mexican overwintering colonies in March illustrates the complex behavioral tradeoffs which surround reproduction and remigration. Malcolm, Cockrell and Brower's elegant study of cardenolide fingerprints conclusively demonstrates the stepwise recolonization of North America by successive broods. Snook presents a detailed and realistic analysis of factors impinging upon monarch conservation at the Mexican overwintering sites, from mistletoe infestations to the poverty of the local people.

The major flaw of this volume is its tardiness in reaching the market. The conference was held more than six years prior to the publication date. It is evident from their failure to accommodate relevant recent publications that many of the manuscripts have not been revised since the late 1980's. Thus, a number of papers have been

anticipated or superseded by publications already available in the periodical literature. In particular, Ritland and Brower's paper on monarch-viceoy (*Limenitis archippus*) mimicry is a recap of Ritland and Brower, 1991 and Ritland, 1991; Vane-Wright's Columbus Hypothesis has largely been covered by a lively debate in *Antenna* (Vane-Wright, 1986, 1987; Malcolm and Brower, 1987) and Malcolm's discussion of the overwintering colonies as an endangered phenomenon has appeared in some form at least twice before (Brower and Malcolm, 1989, 1991).

The datedness of the material is perhaps most evident in the papers that focus on conservation. Aside from Snook's excellent study, most of the contributions are short reports on then-current conservation activities in Mexico, by Monarca A. C. and in California, by the Monarch Project of the Xerces Society. At the time of the conference, then President Miguel de la Madrid had just declared four of the Mexican overwintering sites as ecological reserves, and there was a strong sense of optimism over conservation prospects for those sites. Since 1986, however, one of the sites has been clear cut, and governmentally sanctioned logging proceeds adjacent to the others. Lumber and firewood harvesting by area residents also continues to diminish habitat size, quality and sustainability.

In sum, this book is a collection of generally high-quality studies on various aspects of monarch biology. It will endure more as a source for particular articles than as a comprehensive reference on monarch biology, because it provides but a series of aging snapshots in the vast panorama of our knowledge about the species.—*Andrew V. Z. Brower, Dept. of Entomology, American Museum of Natural History, Central Park West at 79th St., New York, New York 10024-5192.*

#### LITERATURE CITED

- Ackery, P. R. and R. I. Vane-Wright. 1984. Milkweed Butterflies: Their Cladistics and Biology. British Museum (Natural History), London, and Cornell University Press, Ithaca, N.Y., 425 pp.
- Brower, L. P. 1984. Chemical defence in butterflies. In: R. I. Vane-Wright and P. R. Ackery (eds.), *The Biology of Butterflies*. Symposia of the Royal Entomological Society of London 11:109–134 (1989, Princeton University Press, Princeton, N.J.).
- Brower, L. P. and S. B. Malcolm. 1989. Endangered phenomena. *Wings* 14:3–10.
- Brower, L. P. and S. B. Malcolm. 1991. Animal migrations: endangered phenomena. *Am. Zool.* 31:265–276.
- Malcolm, S. B. and L. P. Brower. 1987. White monarchs. *Antenna* 11:2–3.
- Ritland, D. B. 1991. Revising a classic butterfly mimicry scenario: demonstration of Muellerian mimicry between Florida viceroys (*Limenitis archippus floridensis*) and queens (*Danaus gilippus berenice*). *Evolution* 45:918–934.
- Ritland, D. B. and L. P. Brower. 1991. The viceroy butterfly is not a Batesian mimic. *Nature* 350:497–498.
- Tuskes, P. M. and L. P. Brower. 1978. Overwintering ecology of the monarch butterfly (*Danaus plexippus* L.) in California. *Ecol. Ent.* 3:141–153.
- Urquhart, F. A. 1960. *The Monarch Butterfly*. University of Toronto Press, Toronto, 361 pp.
- Vane-Wright, R. I. 1986. White monarchs. *Antenna* 10:117–118.
- Vane-Wright, R. I. 1987. [Reply to Malcolm and Brower.] *Antenna* 11:3.